

STEAM GENERATOR THERMAL VENTING

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BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is generally drawn to methods of sludge removal
10 from steam generator / boiler tubes and more particularly to an improved method
for removing sludge deposits from steam generator / boiler tube support plates
using a combination of thermal stress and intermittent pressure pulses.

2. Description of the Prior Art

15 Deposits and sludge accumulation in boilers can result in four major
problems:

1. Accelerated corrosion of the tube support plates leading to crevice
blockage, pitting that can lead to tube failure and possibly tube
deformation. This phenomenon, known as "denting", can eventually lead
20 to tube cracking.
2. Disruptions in steam/water leading to a reduction in electrical output flow
from the accumulation of corrosion products in flow areas.
3. Decreased heat transfer efficiency of the steam generators leading to a
reduction in electrical output from deposition of the sludge constituents on
25 the outer tube diameter and/or tube sheet.
4. In Recirculating Steam Generators, sludge piles are particularly common
in areas of the generators at the top of the tubesheet with low flow
dynamics known as the "kidney regions". Often these sludge piles can
include particularly non-porous deposits known as "collars." Collars are

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention discloses a method of removing sludge deposits from steam generator tube support plates and tubesheets using a unique process of thermal venting and pressure pulse application called "Steam Generator Thermal Venting". This process may be especially useful in removing very hard "collar deposits" from tube support plates and involves the following steps:

1. Identifying the location(s) of the sludge covered tube support plates TSP or collar;
2. Draining the water level to just above the identified TSP or collar;
3. Allowing the pressure inside the component to increase to a designated level;
4. Venting the boiler/steam generator to induce boiling thus creating both thermal and mechanical stress in the sludge;
5. Draining the boiler to the next sludge clogged TSP; and
6. Repeating steps 2-5.

It should be noted that this process uses no external heat source to heat the water and instead uses the system heat (typically in excess of 250 degrees Fahrenheit.). Also, no external device is used to apply pressure pulses used in this cleaning process. Rather, the boiling caused by the venting process provides the pressure pulses. The number of vents and the duration of venting are based on calculations to determine the desired depth of boiling.

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Referring now to the drawings, Fig. 1 shows a typical recirculating steam generator (A) including the tubesheet (B) from which a series of boiler tubes (C) extending through a series of tube support plates (D) enclosed within an outer shell (E). In cleaning the TSP of the boiler thermal venting of the generator (A) is

